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references. The accounts of the orders and families have been largely rewritten, and include references to extra-limital groups so that the relationships of North American birds to foreign groups is more clearly brought out. Most of the old illustrations have been retained, and over two hundred new ones have been prepared for this edition by Fuertes. Old admirers of the Key will probably rejoice to see the old familiar cuts, absurdly inadequate or useless as many of them were, and now cruelly contrasted with Fuertes' brilliant work.

The great influence which Coues' Key exercised on the ornithologists of the past generation is well known, and it is gratifying to see his work brought as nearly as possible up to date, and its capacity for usefulness thus prolonged. It was always a bulky book, and now, in its present form, it cannot serve as a manual; it must yield the field to later excellent "Keys." But it may still rank as one of the most valuable works on the reference shelf, especially to those who grew up with it.

One is curious, however, with regard to this work of Fuertes, to know whether it represents that artist's earlier or later style. In some of it his worst faults in bird portraiture are too prominent. In his drawing of the Mountain Chickadee (p. 271) in his efforts to show the plumpness of a vigorous bird, the artist has given us an absurd little caricature.

R. H.

Boulenger on the Classification of Bony Fishes.—The most important recent contribution to the taxonomy of fishes is "A Synopsis of the Suborders and Families of Teleostean Fishes," by Dr. G. A. Boulenger of the British Museum, published in the *Annals and Magazine of Natural History* for March, 1904. It is based on his own studies of the fish skeletons in the British Museum and on the work of Woodward, Gill, Jordan, Starks and Regan. The special effort has been to show the relation of the different members of this great group of nearly 12,000 species by a classification based on our knowledge of phylogeny. The result of Dr. Boulenger's work is not essentially different in fact from that of Dr. Gill, although there is considerable divergence in nomenclature. Dr. Gill has preferred to isolate aberrant groups until their true relationship is known. As a result he has recognized twice as many families and twice as many orders as Boulenger, many of these families and orders being provisional. The advantage of this method lies in clear definition. The result of leaving aberrant forms in the group nearest to them is to destroy all possibility of exact limitation. It is at the best impossible to frame exact definitions when transitional groups of all grades exist. A few orders can be isolated and defined among the bony fishes, but the group as a whole cannot be divided into orders or suborders or any other categories which shall have even approximately equal value.

There is no sharp line separating the Isospondyli or Salmon-herring series from the Ganoids, from which they are derived. From the Isospondyli or Malacopterygii, as Dr. Boulenger calls them, all other bony fishes seem to be descended. But the line between the Isospondyli and the Haplomi is a narrow one. The Haplomi have lost the mesocoracoid bone, and as it is abortive in many species (Synodontidae, Myctophidæ) hitherto attached to the Isospondyli, these are placed by Boulenger among the Haplomi. Among the Haplomi, on the other hand, are placed the spiny-rayed Percopsidæ because these have not lost the air duct characteristic of the Isospondyli and their allies.

The eels are divided into two suborders, —the Ostariophysi remain together as one. The Heteromi are made to include Dercetidæ, Halosauridæ and Fierasferidæ.

The transitional types with abdominal ventrals, the air duct and the mesocoracoid being lost, constitute two suborders, which do not differ from each other in definition although comprising different categories of families. The first of these is the suborder of Catosteomi, comprising the Selenichthyes (Lampris), the Hemibranchii, the Lophobranchii, and the Hypostomides. The present reviewer sees no reason for associating Lampris with this group. Its suborder (Selenichthyes) is worthy of independent recognition. The others certainly belong together, and almost as certainly are degenerate or specialized allies of the other transitional group of Percesoces.

In Boulenger's scheme, the Percesoces include not only the Atherinidæ-Sphyrænidæ-Mugilidæ series, but also the Scombresocidæ, the Polynemidæ, the Chiasmodontidæ, the Tetragonuridæ, the Stromateidæ, the Ophiocephalidæ, and the Anabantidæ. As thus arranged, the group is defined only by the imperfect attachment of the ventral fins to the thoracic arch. It cannot be exactly defined and its members are very divergent. It is fair to say, however, that the fault lies with the fishes, not with the classifier. The transitional elements between soft-rayed and spiny-rayed fishes are all still extant, and their intergradations defy classification. For this reason, Dr. Gill once proposed the name Teleocephali for the order containing the whole ancestral trunk of the bony fishes, from the primitive semi-ganoid types to the highly specialized cottoids and labroids, leaving only the divergent branches to be recognized as separate orders.

The Anacanthini, relieved of the flounders which have no relationship to the cod-fishes, Dr. Boulenger places near the Persesoces.

The Ammodytidae are wrongly placed by Dr. Boulenger with the Percesoces; as in Embolichthys, the genus possessing ventral fins, has these fins at the throat.

The great body of the remaining fishes are placed in the suborder Acanthopterygii, defined essentially as by Gill, Jordan and Evermann and Hay. The Beryces are placed among the Perciformes. The recent discovery by Mr. Starks that all Beryces possess the orbitosphenoid bone, absent in other Acanthopterygii and characteristic of the lower forms, indicates that the Beryciformes (Pempheris and Aphredoderus excluded) should form a division by themselves.

The group Zeorhombi, containing Zeidæ and the flounders, represents an ingenious guess. Even if the flounders, as is probable,, be descended from ancestors of Zeus, the present differences justify their separation into a distinct division. Zeorhombi is insusceptible of definition. The remaining orders, Opisthomi, Pediculati, Plectognathi, are arranged as generally accepted, but the Plectognathi are only specialized and degraded offshoots from the Chætodontidæ—Acanthuridæ series with which they form a nearly continuous line of degeneration.

As Dr. Boulenger extends the range of his work, he will find it convenient to recognize a greater number of families, while American ichthyologists will mark their progress by the gradual reduction of the number defined by them. This arises from a different method of work, a different view as to convenience in regard to divergent or imperfectly known forms. Thus every year brings workers on the taxonomy of fishes nearer and nearer together, and farther and farther from the Cuviernian idea of the perch as a perfect fish to be placed first with the others following after.

D. S. J.

Notes on Recent Fish Literature.— In the *Bulletin U. S. Fish Commission* (1902) Jordan and Evermann describe two new fishes from Hawaii, *Tropidichthys psegma* and *Iracundus signifer*, the latter representing a new genus of Scorpænidæ, allied to Pontinus.

In the *Bulletin of the U. S. Fish Commission* for 1902 (1903),